

High school students' intellectual  
processing and introspective feelings about music:  
perceived emotion vs. felt emotion

by

Jody Keesee, BME

A Thesis

In

Music Education

Submitted to the Graduate Faculty  
of Texas Tech University in  
Partial Fulfillment of  
the Requirements for  
the Degree of

Master of Music Education

Approved

Dr. Janice Killian  
Chair of Committee

Dr. Keith Dye

Dr. Carolyn Cruse

Mark Sheridan  
Dean of the Graduate School

August, 2015

Copyright 2015, Jody Keese

## ACKNOWLEDGEMENTS

This project would not be possible without the help and support of many, many people. Due to space, I wish to express my deepest heartfelt gratitude to those individuals directly responsible for this finished work.

Dr. Jan Killian for her constant encouragement, contagious enthusiasm, and teaching me that I can do this.

Dr. Michael Stoune for his patience with my relentless emails and his encouragement to, “Get to work on that thesis!”

Dr. Dye and Dr. Cruse, for their time and wisdom poured into my learning. I will forever be a better person and teacher because of what I have learned while under your tutelage.

Kristina, Trey, Cory, Jace, and Makenzie. You are my world. This NEVER would have happened without your love and grace.

And finally, thanks to Nanny, because she is.

**TABLE OF CONTENTS**

ACKNOWLEDGEMENTS.....ii

LIST OF TABLES.....iv

I. INTRODUCTION.....1

II. REVIEW OF RELATED LITERATURE.....3

    Hypothesis.....5

III. METHODOLOGY.....6

    Participants.....6

    Materials.....6

    Procedures.....8

IV. RESULTS.....10

V. DISCUSSION.....20

REFERENCES.....23

APPENDICES

A. LISTENING STIMULI.....26

B. PARTICIPANT DEMOGRAPHIC INFORMATION.....27

C. MUSICAL STIMULI RESPONSE.....28

D. MUSICAL STIMULI RESPONSE SECOND ASSESMENT.....29

E. IRB APPROVAL LETTER.....30

**LIST OF TABLES**

1. Perceived Emotion.....11

2. Reassessments of excerpts 1, 2, and 10.....13

3. Comparisons of first and second assessments of excerpts 1, 2, 10.....13

4. Intensity of felt emotion.....15

5. Mean intensities grouped by like emotions.....15

6. Percentages of intensities.....16

7. Mean intensity of emotion of excerpt 1.....17

8. Mean intensity of emotion of excerpt 2.....17

9. Mean intensity of emotion of excerpt 3.....17

10. Mean intensity of emotion of excerpt 4.....18

11. Mean intensity of emotion of excerpt 5.....18

12. Mean intensity of emotion of excerpt 6.....18

13. Mean intensity of emotion of excerpt 7.....18

14. Mean intensity of emotion of excerpt 8.....19

15. Mean intensity of emotion of excerpt 9.....19

16. Mean intensity of emotion of excerpt 10.....19

## **CHAPTER I**

### **INTRODUCTION**

The effects of music on human emotion and character have been a topic of interest and scholarship since the time of Aristotle (Burkholder, Grout, & Palisca, 2010). More specifically in the area of music and emotion are studies in the realm of perceived emotion versus felt emotion while listening music (Gabrielsson, 2001-02; Kreutz, Ott, Teichmann, Osawa, & Vaitl, 2008). “Perceived emotion refers to intellectual processing, i.e. the perception of an intended or expressed emotional character, whereas felt emotions reflect the introspective perception of physiological changes, which are often associated with emotional self-regulation” (Kreutz, et al., 2008). An example of the difference between perceived and felt emotion is, a listener may listen to a piece of music and perceive it as ‘sad,’ but they may or may not be affected by a feeling of ‘sadness’ (Robazza et al., 1994).

In a study examining if children and adults use the same criterion in deciding if music sounds happy or sad, researchers discovered that children as young as the age of five are able to make the happy/sad determination (Dalla Bella, Peretz, Rousseau, & Gosselin, 2001). Although the area of emotional response to music is a burgeoning domain of investigation and of great controversy (Juslin & Västfjäll, 2008), little to none address the question of high school students’ ability to perceive a predetermined emotion of a musical stimulus and introspectively feel the emotion, and if so, how intensely the emotion is felt.

Modeling from procedures based on Kreutz, et al., (2008), the purpose of this study is to examine if high school choral students can perceive and positively identify

predetermined emotion of a musical excerpt and rate to a degree, if any, the felt intensity of their perceived emotion.

## CHAPTER II

### REVIEW OF RELATED LITERATURE

Sloboda and Juslin (as cited by Mohn, Heike, & Wilker, 2010) reported that participants are quite skilled at determining emotional content of music. However, much research is limited to the recognition of the emotions happy and sad when listening to music, similar to the above referenced study by Dalla Bella, et al., (2001) as well as Mohn, et al., (2010). In contrast, researchers within the last two decades have however, previously identified seven basic emotions perceived by human beings when listening to music - happiness, anger, disgust, surprise, sadness, peace, and fear (Kreutz et al., 2008; Mohn et al., 2010; Vieillard et al., 2008).

As stated earlier, there are significant debates as to whether or not music has the ability to induce felt emotion and how this process occurs (Juslin & Västfjäll, 2008). It is argued that music preference and background such as ethnicity, culture, having participated in a formal or informal music setting, how often and what genre of music listened to, are vital to the understanding of this process (Vieillard et al., 2008); however, Bigand and collaborators (2005) provided evidence that groupings of trained and non-trained music listeners' ability to group musical excerpts that conveyed similar emotions were highly consistent irrespectively of listeners' musical background and experimental session (Vieillard et al., 2008). There is also much literature addressing a substantial complex cognitive and physiological process that occurs when one evaluates music and



thus becomes induced into emotion (Baumgartner, Esslen, & Jäncke, 2005; Koelsch & Siebel, 2005; Scherer, 2004). There are varying opinions on exactly how, or if, music does indeed cause emotional responses to music. Juslin and Västfjäll cites Becker (2001) as stating that “emotional responses to music do not occur spontaneously, nor naturally” (Juslin & Västfjäll, 2008, p.560). However, Peretz (2001), as cited by Juslin and Västfjäll (2008), states that “this is what emotions are: spontaneous responses that are difficult to disguise” (Juslin & Västfjäll, 2008, p.559). Gabrielsson (2002) posits through a compilation of research that there are two ideas of interest when listening to music, emotion perceived and emotion felt. In other words, one may perceive a feeling of sadness in music but not necessarily be affected to feel sadness.

In Kreutz et al., (2008), the authors sought to address multiple benchmarks regarding the induction of emotion during music listening in adults. Such benchmarks included emotion, influences on musical preference and absorption trait on induced emotion, pleasantness, and arousal for each musical excerpt. The authors, through an unreported screening process, unanimously selected and predetermined twenty-five excerpts (five from each forthcoming emotion category) from classical instrumental music to represent ‘happiness,’ ‘sadness,’ ‘fear,’ ‘anger,’ and ‘peace.’ They discovered that “instrumental music appears effective for the induction of basic emotions in adult listeners” (Kreutz et al., 2008, p.101).

There are two areas of interest from Kreutz, et al., (2008) that are the focus of the current study: perceived emotion and felt emotion. Are high school students able to intellectually process and perceive a pre-determined emotion of musical stimuli and thus

introspectively be induced to feel their perceived emotion, and if so, how intensely do they feel their perceived emotion?

### **Hypothesis**

$H_0$  – There will be a significant difference in participants' perceived emotion of musical stimulus and the predetermined emotion of musical stimulus.

$H_1$  – There will not be a significant difference in participants' perceived emotion of musical stimulus and the predetermined emotion of musical stimulus.

## **CHAPTER III**

### **METHODOLOGY**

#### **Participants**

Participants ( $N = 81$ ) were male ( $n=28$ ) and female ( $n=53$ ) students in a choral classroom in grades 9-12 ranging in age from 14-17 years with Hispanics, Caucasians, and African-Americans representing participant ethnicities. Participants were in a 4-A high school in a rural West Texas town with an approximate population of 14,000 residents. Because this study is based on procedures by Kreutz (2008), comparisons between the methodologies of Kreutz and the current study will be noted throughout. Participants in the Kreutz et al., (2008) study ( $N = 99$ ; 80 female) were primarily undergraduate students at the University of Giessen, Germany ranging in ages from 17-43 years of age and recruited through bulletin postings from the Psychology Department.

#### **Materials**

##### *Stimuli*

The ten musical stimuli in this study were randomly selected from a listing of twenty-five musical stimuli used in Kreutz et al., (2008). Through a screening process the three authors of Kreutz et al., (2008) unanimously determined the appropriateness of twenty-five classical instrumental musical stimuli to induce certain emotions. There were five excerpts (Kreutz et al., 2008) each demonstrated to represent one of five emotion categories: happiness, sadness, fear, anger, and peace. See Figure 1. It is from Kreutz' original list of twenty-five musical stimuli that the author of the present study chose ten stimuli to utilize in the current study (The entire list appears in Appendix A).

Excerpt #	Emotion	Composer	Title	Period
2	Happiness	Joseph Haydn	Symphony No. 70, D Major	Classical
9	Happiness	Johann Strauss II	<i>Tausendundeine Nacht</i>	Romantic
7	Sadness	Tomaso Albinoni	<i>Adagio</i> , G minor	Baroque
1	Sadness	John Dowland	<i>Dances from Lachrimae: Semper Dowland Semper Dolens</i> , 'Goe Nightly Cares'	Renaissance
8	Anger	Edgar Varese	<i>Arcana</i> for full orchestra	Modern
3	Anger	Dimitri Shostakovich	Symphony No. 10, E minor, Op. 14: <i>Allegro</i>	Modern
4	Peace	Arthur Foote	'Capricorn' concerto, 1. 'Air'	Modern
5	Peace	Pietro Mascagni	<i>Cavalleria rusticana</i> , 'intermezzo'	Baroque
6	Fear	Luigi Nono	<i>Ricorda cosa ti hanno fatto in Auschwitz</i> for voices and tape	Modern
10	Fear	Olivier Messiaen	<i>Danse de la fureur</i> , <i>pour les sept trompettes</i>	Modern

Figure 1 *Listening Stimuli*

Since the present study is based on procedures outlined in Kreutz et al., (2008), the musical stimuli were chosen from the original list of twenty-five excerpts as a means of validity as the excerpts were already predetermined to represent one of the five emotion categories.

The ten pieces were purchased from iTunes and downloaded onto a MacBook Pro. The pieces were processed through sound processing software (Garage Band by Apple) and were edited into 65-second excerpts from the beginning of the piece and fading out at 61 seconds to end at 65 seconds. There were 15 seconds between each stimulus to allow for participant consideration and response. The pieces were placed in an iTunes playlist in random order so that "successive excerpts did not represent the same intended emotion" (Kreutz et al., 2008, p.106). The playlist contained an extra piece at

the beginning to allow participants a trial example for understanding the procedures for the ten remaining musical excerpts and for volume control. Although Kreutz et al., (2008) used musical “excerpts,” it was not reported regarding how long they lasted or if they were played in their entirety. The author of the present study chose a 65 and 15-second limit on the musical stimuli simply to ensure completing the assessment within one class period.

### *Questionnaires*

Participants provided basic demographic information on the first page, which included present grade in school, gender, and ethnicity. Additionally, the first page included detailed instructions and a section for a trial example to test participants’ understanding of the procedures (see Appendix B).

The response sheets (see Appendix C) contained one question and one rating scale for each musical stimulus. The participants circled their felt emotion (one of the five emotions previously mentioned) and rated the intensity of each emotion they felt while listening to each stimulus. Emotional intensity was rated on a seven-point Likert-type scale as ‘0’ (not at all) to ‘6’ (very strongly). The questionnaire in the present study is a reduced and modified version of the Kreutz, et al., (2008).

### **Procedure**

Participants were all assessed as one group in their regular choral classroom setting. They were each given the questionnaire and response sheets and asked to sit as comfortably as possible on the risers or floor, following procedures used during their regular choral classes. Participants were given instructions and led through the example stimulus. Stimuli were played from an Apple iTunes Playlist from an Apple MacBook

Pro and amplified via Roland CM-30 Cube Monitor. The assessment finished 15 seconds after the last stimulus played and participants were instructed to turn their response sheets over, which were then collected individually. All procedures for the protection of human subjects were followed as specified by Texas Tech University. The Internal Review Board acceptance letter for this research appears in Appendix E.

## **CHAPTER IV**

### **RESULTS**

Tally marks were used to mark each participant's two responses for each of the 10 musical stimuli: a tally for perceived emotion and a tally for intensity of felt emotion.

Thus raw data consisted of the frequency with which an emotion was chosen (perceived emotion), and the likert-type scale indicating the intensity of each participant's felt emotion. Table 1 shows the responses of counted tallies for the perceived emotions of each musical excerpt. Like emotions are grouped together for comparison. Targeted emotions for each excerpt (as identified by Kreutz et al., 2008) are notated with an asterisk. Chi-squares were performed on each excerpt using the totals from each of the observed perceived emotions to check for significant differences in the frequency of the targeted emotion.

Table 1 *Perceived emotion*

EMOTION	Happiness	Sadness	Fear	Anger	Peace	Participants
EXCERPT						
2-Happiness	*38	1	29	12	1	81
9-Happiness	*^78	0	1	0	2	81
1- Sadness	1	*40	11	4	25	81
7 - Sadness	8	*^46	5	1	21	81
6 - Fear	0	1	*^52	28	0	81
10 - Fear	30	2	*27	16	6	81
3 - Anger	1	19	32	*18	11	81
8 - Anger	1	0	40	*38	2	81
4 - Peace	38	6	1	0	*36	81
5 - Peace	9	19	2	1	*^50	81

\*Target emotion      \*^ Statistically significant identification of pre-determined emotion

In 6 out of 10 excerpts, participants positively identified the targeted emotion by majority selection. The 4 exceptions to this pattern will be specified later. In 4 of the 6 positively identified excerpts, only 4 excerpts were significantly identified as the target emotion: Peace, no.5,  $p = 0.0003$ ; Fear, no.6,  $p = 0.0101$ ; Sadness, no.7,  $p = 0.0034$ ; Happiness, no.9,  $p = < 0.0001$ .



In regards to ‘sadness,’ nos.1 and 7, the intended emotion was uniform and strong with both excerpts. There was some ambiguity between ‘peace’ and ‘happiness’ on no.4 - ‘peace,’ and ‘fear’ and ‘anger’ on nos.3 and 8 - ‘anger.’ Interestingly, there was a contradiction of perceived emotion between ‘happiness’ and ‘fear’ with nos. 2 and 10, ‘happiness’ and ‘fear,’ respectively.

In reference to the 4 exceptions stated earlier, nos. 3, 4, and 8 were ambiguous based on comparable emotions: ‘peace’ and ‘happiness;’ ‘fear’ and ‘anger.’ Excerpt no.10, ‘fear’ was split almost evenly between two contradictory emotions: ‘fear’ and ‘happiness.’ Overall it appears that the data support Juslin and Västfjäll (2008) who stated that, “this is what emotions are: spontaneous responses that are difficult to disguise” (Juslin & Västfjäll, 2008, p.559).

Excerpts 1, 2, and 10 appeared to have the most conflicting results and were thus chosen to be re-assessed to check for consistency, or lack thereof, between the two assessments. For the second assessment (See Appendix D) choral classes were instructed to write why the participant chose a particular emotion for each excerpt. The added instructions were expected to identify reasons for choosing conflicting emotions should that occur during the second assessment. Table 2 shows the results of the re-assessment while Table 3 shows a side-by-side comparison between the first and second assessments for excerpts 1, 2, and 10.

Table 2 *Re-assessment of excerpts 1, 2, and 10*

EMOTION	Happiness	Sadness	Fear	Anger	Peace	Participants
EXCERPT						
1 - Sadness	3	*61	1	0	16	81
2 - Happiness	*38	0	25	17	1	81
10 - Fear	26	0	*27	28	0	81

\*Target Emotion

Table 3 *Comparison of the first and second assessments of excerpts 1, 2, and 10*

EMOTION	Happiness	Sadness	Fear	Anger	Peace	Participants
EXCERPT						
1-Sadness-1	1	*40	11	4	25	81
1-Sadness-2	3	*61	1	0	16	81
2-Happiness-1	*38	1	29	12	1	81
2-Happiness-2	*38	0	25	17	1	81
10-Fear-1	30	2	*27	16	6	81
10-Fear-2	26	0	*27	28	0	81

\*Target Emotion

There were few differences between the first and second assessments, however the most notable difference was in ‘sadness’ for excerpt 1. Although there is a 21-point difference between the first and second assessment for excerpt 1, it is within the same-targeted pre-determined emotion.

The second assessment resulted in a statistically significant identification of the target emotion for excerpt 1, 'sadness', with  $p = < 0.0001$ . The confusion between 'sadness' and 'peace', for excerpt 1-'sadness' is observed with the language used by participants describing 'sadness' as "Low notes...slow...soft". The participants perceiving 'peace' describe it as, "slow...calm...smooth." In describing why participants chose the emotions 'happiness' and 'fear', for excerpt 2-'happiness', the participants that chose 'happiness' included language that developed a common theme, "fast...upbeat...high notes." Furthermore, participants that chose 'fear' used the same language as those that chose 'happiness,' but included "loud" and "intense" to describe why they chose 'fear.' For excerpt 10-'fear,' participants perceiving 'happiness' said, "loud...fast...rhythmic...sounds like a game." "Hard notes...loud...intense," were the words used to describe the perception of 'fear' for excerpt 10-'fear,' by participants that chose such.

The intensities of participants perceived and felt emotions are shown in Table 4 and Table 5. Table 4 shows the tally count for each degree of intensity on the Likert-type scale and Table 5 shows the mean intensities with like emotions grouped together for comparison. Table 6 shows the percentages of the three defined categories of intensity. Like emotions are grouped together for comparison. For the purpose of this study, '0-1' is defined as Nominal Intensity, '2-4' is defined as Moderate Intensity, and '5-6' is defined as Significant Intensity. The percentages from the three categories were added for each column.

Table 4 *Intensity of felt emotion*

INTENSITY OF EMOTION	0	1	2	3	4	5	6	Mean Intensity
EXCERPT								
1 - Sadness	3	5	18	18	22	10	5	3.426
2 - Happiness	1	2	15	16	22	17	8	3.716
3 - Anger	1	7	12	16	22	18	5	3.543
4 - Peace	1	3	12	13	19	18	15	3.975
5 - Peace	1	5	7	20	23	12	13	3.814
6 - Fear	2	1	1	4	7	9	57	5.308
7 - Sadness	3	2	12	13	23	23	5	3.728
8 - Anger	2	4	3	8	12	26	26	4.543
9 - Happiness	1	1	1	5	14	28	31	4.938
10 - Fear	5	8	13	21	20	8	6	3.123

Table 5 *Mean intensities grouped by like emotions*

1 - Sadness	3.426	2 - Happiness	3.716	3 - Anger	3.543	4 - Peace	3.975	6 - Fear	5.308
7 - Sadness	3.728	9 - Happiness	4.938	8 - Anger	4.543	5 - Peace	3.814	10 - Fear	3.123

Table 6 *Percentages of intensities*

	Nominal Intensity 0-1	Moderate Intensity 2-4	Significant Intensity 5-6
2-Happiness	3.7%	65.4%	30.86%
9-Happiness	2.46%	24.69%	72.83%
1-Sadness	9.87%	71.6%	18.5%
7-Sadness	6.17%	59.25%	34.56%
6-Fear	3.7%	14.8%	81.48%
10-Fear	16%	66.66%	17.28%
3-Anger	9.87%	61.7%	28.39%
8-Anger	7.4%	28.39%	64.19%
4-Peace	4.9%	54.3%	40.7%
5-Peace	7.4%	61.7%	30.86%

The results of adding each column were 71.47%, 508.49%, and 419.65%, respectively. Chi-squares were performed to check for statistical significance among the total percentages of the three categories. Participants were found to have experienced a level of ‘moderate intensity’ in a statistically significant manner ( $p = 0.0039$ ) compared to ‘nominal intensity’ and ‘significant intensity.’ On a singular level it was observed that, based on the mean intensities of emotions, no.6-‘fear,’ no.8-‘anger,’ and no.9-‘happiness’ were more highly rated than the emotions of other musical excerpts.

The subsequent tables, Tables 7-16, are the mean ratings calculated for each of the 10 musical stimuli to determine if there was a positive emotional response between perceived emotions and felt emotions. To figure the mean intensity of felt emotion, total tallies for each degree of emotion were multiplied by the intensity of emotion; those sums were added together and divided by the total number of participants ( $N = 81$ ). This method of computation was chosen so as to have a meaningful number.

Table 7 Mean intensity of emotion of excerpt 1

INTENISTY OF EMOTION	0	1	2	3	4	5	6
EXCERPT	3x0=0	5x1=5	2x18=36	3x18=54	4x22=88	5x10=50	6x5=30
1 - Sadness	3	5	18	18	22	10	5

$0+5+36+54+88+50+30=263$ .  $263/81=3.426$

Table 8 Mean intensity of emotion of excerpt 2

INTENISTY OF EMOTION	0	1	2	3	4	5	6
EXCERPT	1x0=0	2x1=2	15x2=30	16x3=48	22x4=88	17x5=85	8x6=48
2 - Happiness	1	2	15	16	22	17	8

$0+2+30+48+88+85+48=301$ .  $301/81=3.716$

Table 9 Mean intensity of emotion of excerpt 3

INTENISTY OF EMOTION	0	1	2	3	4	5	6
EXCERPT	1x0=0	7x1=7	12x3=36	16x3=48	22x4=88	18x5=90	5x6=30
3 - Anger	1	7	12	16	22	18	5

$0+7+36+48+88+90+30=299$ .  $299/81=3.691$

Table 10 Mean intensity of emotion of excerpt 4

INTENISTY OF EMOTION	0	1	2	3	4	5	6
EXCERPT	1x0=0	3x1=3	12x2=24	13x3=39	19x4=76	18x5=90	15x6=90
4 - Peace	1	3	12	13	19	18	15

$0+3+24+39+76+90+90=322$ .  $322/81=3.975$

Table 11 Mean intensity of emotion of excerpt 5

INTENISTY OF EMOTION	0	1	2	3	4	5	6
EXCERPT	1x0=0	5x1=5	7x2=14	20x3=60	23x4=92	12x5=60	13x6=78
5 - Peace	1	5	7	20	23	12	13

$0+5+14+60+92+60+78=309$ .  $309/81=3.814$

Table 12 Mean intensity of emotion of excerpt 6

INTENISTY OF EMOTION	0	1	2	3	4	5	6
EXCERPT	2x0=0	1x1=1	1x2=2	4x3=12	7x4=28	9x5=45	57x6=342
6 - Fear	2	1	1	4	7	9	57

$0+1+2+12+28+45+342=430$ .  $432/81=5.308$

Table 13 Mean intensity of emotion of excerpt 7

INTENISTY OF EMOTION	0	1	2	3	4	5	6
EXCERPT	3x0=0	2x1=2	12x2=24	13x3=39	23x4=92	23x5=115	5x6=30
7 - Sadness	3	2	12	13	23	23	5

$0+2+24+39+92+115+30=302$ .  $302/81=3.728$

Table 14 Mean intensity of emotion of excerpt 8

INTENISTY OF EMOTION	0	1	2	3	4	5	6
EXCERPT	2x0=0	4x1=4	3x2=6	8x3=24	12x4=48	26x5=130	26x6=156
8 - Anger	2	4	3	8	12	26	26

$0+4+6+24+48+130+156=368$ .  $368/81=4.543$

Table 15 Mean intensity of emotion of excerpt 9

INTENISTY OF EMOTION	0	1	2	3	4	5	6
EXCERPT	1x0=0	1x1=1	1x2=2	5x3=15	14x4=56	28x5=140	31x6=186
9 - Happiness	1	1	1	5	14	28	31

$0+1+2+15+56+140+186=400$ .  $400/81=4.938$

Table 16 Mean intensity of emotion of excerpt 10

INTENISTY OF EMOTION	0	1	2	3	4	5	6
EXCERPT	5x0=0	8x1=8	13x2=26	21x3=63	20x4=80	8x5=40	6x6=36
10 - Fear	5	8	13	21	20	8	6

$0+8+26+63+80+40+36=253$ .  $253/81=3.123$



## **CHAPTER V**

### **DISCUSSION**

The goal of this study was two-fold. First, could high school students listen to classical instrumental music excerpts and perceive and positively identify one of five pre-determined emotions associated with each excerpt? Second, were high school students induced into their perceived emotion for each musical excerpt and if so, to what degree of intensity?

Regarding the first question, it was hypothesized that participants would significantly most often choose the corresponding pre-determined emotion to each musical excerpt. This was discovered not to be the case as only four of the ten musical excerpts (5, 6, 7, 9) showed statistical significance for the target emotion, even though it was found that the majority of the stimuli, six out of ten excerpts (1, 2, 5, 6, 7, 9) were positively identified with their pre-determined emotion. The other four out of ten excerpts (3, 4, 8, 10) showed the majority of students selected a non-target emotion. Excerpts 3 and 8, both ‘anger,’ showed some ambiguity between the corresponding emotions ‘fear’ and ‘anger,’ while excerpt 4 ‘peace,’ showed ambiguity between the corresponding emotions ‘happiness’ and ‘peace’. Excerpt 10 ‘fear,’ showed a confused choice of contradictory emotions ‘happiness’ and ‘fear’ on both the first and second surveys (see Table 1).

The confusion over comparable emotions, such as ‘happiness’ and ‘peace,’ ‘anger’ and ‘fear,’ are not new to research involving music and emotions. Juslin and Sloboda (2001) point out that the origins of emotional responses to music listening are not known. However, properties of musical stimuli (loud, soft, fast, slow, rhythmic

patterns, scales) and individual differences of listeners (formal or informal participation in music, cultural cues and learning) are of significant importance when addressing perceived emotional responses to music listening. The apparent discrepancies in perceived emotions that were re-surveyed the second time (see Table 2 and Table 3) are explained by the participants' identification of the properties of musical stimuli, but were perceived differently perhaps due to participants' differences in participants cultural cues and learning. Furthermore, individual differences and personality traits are an important part of influencing emotional responses when listening to music (Balkwill & Thompson, 1999; Kreutz et al., 2008; McNamara & Ballard, 1999; Nater et al., 2005).

The second question regarding intensity of felt emotion was not part of the formal hypothesis, however, it was expected that participants would experience 'significant intensity' for each emotion based on the research of Kreutz, et al., (2008). The moderate level of intensity indicated by most participants could be due to pre-selected stimuli. "Pre-selection is necessary to construct generalized and reliable stimulus materials... emotional responses are presumably greater if self-selected instead of pre-selected stimuli are used" (Kreutz et al., 2008, p.104). One of the major contributing factors for the difference between intensities of emotions felt in the Kreutz study and present study might be the result of the survey conditions. For the present study, participants ( $N = 81$ ), were all seated throughout a large choral classroom. During the survey, multiple distractions ensued due to the nature of a normal classroom in a high school. Interruptions due to students being called to the office, the classroom office phone ringing, and students arriving late in the middle of class for various reasons were all thought to be possible contributing factors to a less focused state of mind for the

participants. In Kreutz et al., (2008), participants were all surveyed individually in a dimly lit room, seated in a comfortable recliner, and free from distractions.

Caution should be used when generalizing the results, as this data was obtained from an isolated study. Different populations may respond differently based on background, preference, and stimuli used. Further research is encouraged regarding larger and more varied genres of music to check for positive relationships between perceived and felt emotions. Other research might include musical choice affecting a high school student's academic performance. If students were allowed to listen to self-selected music that evokes positive emotion while doing course work, could this affect their academic achievement in positive way? Would felt intensity and ability to focus change for perceived emotion from self-selected musical stimuli? What would the 'perceived vs. felt' look like among gender and ethnicities of high school students? How would this study compare among students with more exposure to classical music from a larger town or city?

Due to the expanding research on the positive affects of music on adolescent human emotion and behavior, it is the present author's hope that the research in that field transfer and be applied to studying the affects of listening to classical music on high school students' academic performance. Understanding high school students' perception of classical music and its evoking of felt emotion is believed to be a key part of that research.

## REFERENCES

- Bachorik, J. P., Bangert, M., Loui, P., Larke, K., & Berger, J. (2009). Emotion in motion: Investigating the time-course of emotional judgments of musical stimuli. *Music Perception: An Interdisciplinary Journal*, 26(4), 355-364.
- Balkwill, L., & Thompson, W. F. (1999). A cross-cultural investigation of the perception of emotion in music: Psychophysical and cultural cues. *Music Perception: An Interdisciplinary Journal*, 17(1), 43-46.
- Baumgartner, T., Esslen, M., & Jäncke, L. (2006). From emotion perception to emotion experience: Emotions evoked by pictures and classical music. *International Journal of Psychophysiology*, 60, 34-43.  
<http://dx.doi.org/10.1016/j.iopsycho.2005.04.007>
- Bigand, E., Vieillard, S., Madurell, F., Marozeau, J., & Dacquet, A. (2005). Multidimensional scaling of emotional responses to music: The effect of musical expertise and of the duration of the excerpts. *Cognition & Emotion*, 19(8), 1113-1139. doi:10.1080/02699930500204250
- Burkhlder, J. P., Grout, D. J., & Palsica, C. V. (2010). *A history of western music* (8th ed.). New York, NY: W.W. Norton & Company.
- Dalla Bella, S., Peretz, I., Rousseau, L., & Gosselin, N. (2001). A developmental study of the affective value of tempo and mode in music. *Cognition*, 80, B1-B10.
- Gabreilsson, A. (2001-02). Emotion perceived and emotion felt: Same or different? *Musicae Scientiae, Special Issue*, 123-149.  
<http://dx.doi.org/10.1177/10298649020050S105>

- Juslin, P. N., & Västfjäll, D. (2008). Emotional responses to music: The need to consider underlying mechanisms. *Behavioral and Brain Sciences*, *31*, 559-575.  
<http://dx.doi.org/10.1017/S0140525X08005293>
- Kawakami, A., Kiyoshi, F., Katahira, K., Kamiyama, K., & Okanoya, K. (2013). Relations between musical structures and perceived and felt emotions. *Music Perception: An Interdisciplinary Journal*, *30*(4), 407-417.
- Koelsch, S., Siebel, W. A., & Planck, M. (2005). Towards a neural basis of music perception. *Trends in Cognitive Sciences*, *9*(12), 578-584.  
<http://dx.doi.org/10.1016/j.tics.2005.10.001>
- Kreutz, G., Ott, U., Teichmann, D., Osawa, P., & Vaitl, D. (2007). Using music to induce emotions: Influences of musical preference and absorption. *Psychology of Music*, *36*(1), 101-126. <http://dx.doi.org/10.1177/0305735607082623>
- McNamara, L., & Ballard, M. E. (1999). Resting arousal, sensation seeking, and music preference. *Genetic, Social & General Psychology Monographs*, *125*(3), 229-250.
- Mohn, C., Argstatter, H., & Wilker, F.W. (2010). Perception of six basic emotions in Music. *Psychology in Music*, *39*(4), 503-517.  
[doi.org/10.1177/0305735610378183](http://dx.doi.org/10.1177/0305735610378183)
- Nater, U.M., Krebs, M. & Ehlert, U. (2005). Sensation seeking, music preference, and psychophysiological reactivity to music. *Musicae Scientiæ: The Journal Of The European Society For The Cognitive Sciences Of Music*, *9*(2), 239-254.
- Schellenberg, E. G., Nakata, T., Hunter, P. G., & Tamoto, S. (2007). Exposure to music and cognitive performance: Tests of children and adults. *Psychology of Music*, *35*(1), 5-19. <http://dx.doi.org/10.1177/03057356070688885>

- Scherer, K. R. (2004). Which emotions can be induced by music? What are the underlying mechanisms? And how can we measure them? *Journal of New Music Research, 33*(3), 239-251. <http://dx.doi.org/10.1080/092982104200031782>
- Van den Tol, A. J. M., & Edwards, J. (2011). Exploring a rationale for choosing to listen to sad music when feeling sad. *Psychology of Music, 41*(4), 440-465. <http://dx.doi.org/10.1177/0305735611430433>
- Vieillard, S., Peretz, I., Gosselin, N., Khalfa, S., Gagnon, L., & Bouchard, B. (2008). Happy, sad, scary, and peaceful musical excerpts for research on emotions. *Cognition and Emotion, 22*(4), 720-752. <http://dx.doi.org/10.1080/02699930701503567>
- Wilhelm, K., Gillis, I., Schubert, E., & Whittle, E. L. (2013). On a blue note: Depressed peoples' reasons for listening to music. *Music and Medicine, 5*(2). <http://dx.doi.org/10.1177/1943862113482143>

**APPENDIX A  
LISTENING STIMULI**

	Emotion	Composer	Title	Period
1	Happiness	Joseph Haydn	Symphony No. 70, D Major	Classical
2	Happiness	Johann Strauss II	<i>Tausendundeine Nacht</i>	Romantic
3	Sadness	Tomaso Albinoni	<i>Adagio</i> , G minor	Baroque
4	Sadness	John Dowland	<i>Dances from Lachrimae: Semper Dowland Semper Dolens</i> , ‘Goe Nightly Cares’	Renaissance
5	Anger	Edgar Varese	<i>Arcana</i> for full orchestra	Modern
6	Anger	Dimitri Shostakovich	Symphony No. 10, E minor, Op. 14: <i>Allegro</i>	Modern
7	Peace	Arthur Foote	‘Capricorn’ concerto, 1. ‘Air’	Modern
8	Peace	Pietro Mascagni	<i>Cavalleria rusticana</i> , ‘intermezzo’	Baroque
9	Fear	Luigi Nono	<i>Ricorda cosa ti hanno fatto in Auschwitz</i> for voices and tape	Modern
10	Fear	Olivier Messiaen	<i>Danse de la fureur</i> , <i>pour les sept trompettes</i>	Modern
<u>Example (Trial)</u>				
1	Sadness	Ludwig Beethoven	Piano Sonata No. 14, C Sharp minor, Op. 27. <i>Moonlight Sonata</i>	Romantic









## APPENDIX E IRB APPROVAL LETTER



May 14, 2014

Dr. Janice Killian  
Music - V&PA  
Mail Stop: 2033

Regarding: 504528 Perceived Emotion vs. Felt Emotion: A Study of High School Students' Intellectual Processing and Introspective Feelings about Music

Dr. Janice Killian:

The Texas Tech University Protection of Human Subjects Committee approved your claim for an exemption for the protocol referenced above on May 14, 2014.

Exempt research is not subject to continuing review. However, any modifications that (a) change the research in a substantial way, (b) might change the basis for exemption, or (c) might introduce any additional risk to subjects must be reported to the Human Research Protection Program (HRPP) before they are implemented.

To report such changes, you must send a new claim for exemption or a proposal for expedited or full board review to the HRPP. Extension of exempt status for exempt protocols that have not changed is automatic.

The HRPP staff will send annual reminders that ask you to update the status of your research protocol. Once you have completed your research, you must inform the HRPP office by responding to the annual reminder so that the protocol file can be closed.

Sincerely,

Rosemary Cogan, Ph.D., ABPP  
Protection of Human Subjects Committee